Savannah River Hydrogen Storage Technology

DOE Pre-solicitation Meeting
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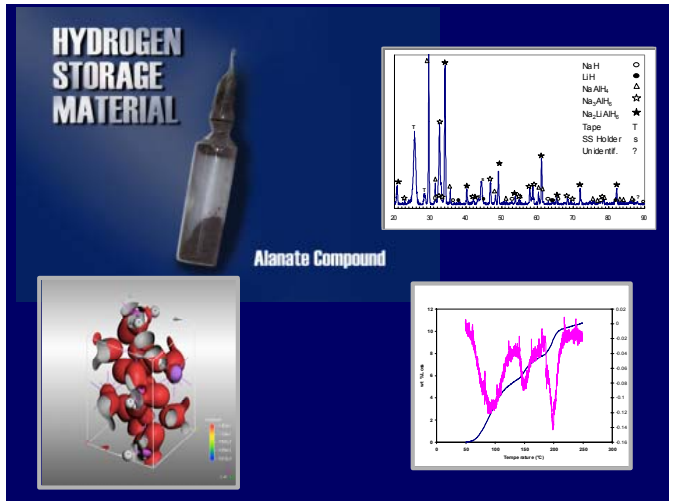
Savannah River

- **Federal R&D Center at Savannah River Site**
  - **SRS is part of DOE Defense Complex (14,000 employees & 310 sq. miles)**
  - **Hydrogen (i.e. tritium) major mission for over 50 years**
  - **Designed, built and currently operate world's largest MH based processing facility**
- **Increasing focus on related national needs**
  - **Laboratory has 750 professionals (45% advanced degrees)**
  - **Over 80 scientists/engineers dedicated to hydrogen technology (*probably largest hydrogen staff in country)***
  - **Provide technical solutions from concept-RD&D-operation**
  - **Current major focus on hydrogen technology**

Advanced Hydride Laboratory

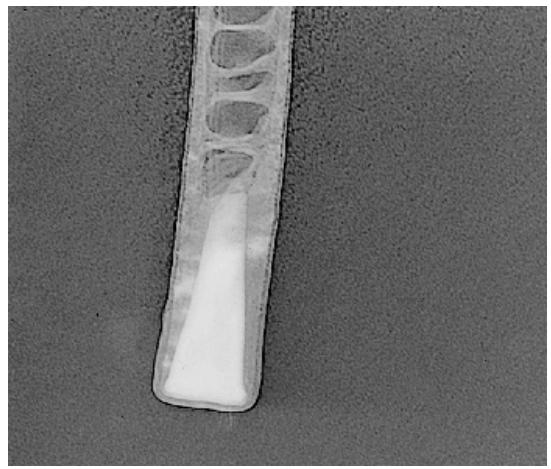
Fuel Cell Vehicle with MH Storage

Hydrogen Research Laboratory



Alanate Research Program

- 80,000 ft^2 hydrogen R&D lab in progress
  - Located at Savannah River Research Park
  - 30,000 ft^2 reserved for academic & industrial partners
- Operation scheduled for Summer 2004
- Focus on hydrogen R&D
  - Advanced storage
  - Separation, production, sensors, safety and hydrogen effects on materials



Doped Carbon Nanotube

Metal Hydride Center of Excellence

- **Savannah River - *Center Lead***
  - Large existing hydrogen research staff
  - Over 25 years of metal hydride experience
  - Charter Member of DOE Working Group on Complex Hydrides
  - Lead PI has key patents in alanate/complex hydrides
- **Extensive Track Record and Existing Facilities**
  - Partnerships with universities and industry
  - Ongoing CRADA with major industrial partner directed at high-capacity storage for fuel cell applications
  - Research facilities include:
    - Inert atmosphere chambers, high pressure manifolds, pressurized ball mills, characterization/analytical instrumentation, etc.
    - Additional facilities and equipment planned for new laboratory

Partners and Support

	SRTC	Nat Labs	Univ.	Industry
• Program Coordination	X			
• Material Development	X	x	X	x
– Develop New Compositions				
– Kinetic Enhancements				
• Material Characterization	x	X	x	x
– Thermodynamics and Kinetics				
– Structure, Spectroscopic & Surface Analysis				
• Structural and Dynamic Modeling	x	X	X	
• Scale Up and Engineering Development	X			X

Additional Hydrogen Storage Activities

- **Carbon - *Partner***
  - Member of DOE Carbon Working Group
  - Developed novel method for forming doped carbon nanotubes as part of DOE Storage Program (patent pending)
  - Collaborated with universities and others in hydrogen and carbon systems
- **Chemical Hydrides - *Partner***
  - Internally funded R&D on borohydride materials
  - New high pressure testing and material processing capabilities
  - Extensive expertise in chemical processing and engineering to support regeneration scale up
  - Collaborated with leading universities on chemical hydrides for DOD R&D applications
  - Currently working with DOD on reviewing chemical hydride technology as part of DUS&T Program